SOIL SURVEY OF THE FORT PAYNE AREA, ALABAMA,

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LOCATION AND BOUNDARIES OF THE AREA.

The Fort Payne area comprises about 509 square miles in the northeastern part of Alabama. It includes the southeastern part of Dekalb County, the western part of Cherokee County, a small portion of Jackson County, and, in the extreme northeast corner, a very small portion of the State of Georgia. The area thus embraced is 27 miles long and 17½ miles wide.

Fort Payne, the county seat of Dekalb County, is situated in the north central part of the area. It has a population of about 1,500. Collinsville, 15 miles to the south, and Gaylesville, in Cherokee County, are the largest and most important towns of the area.

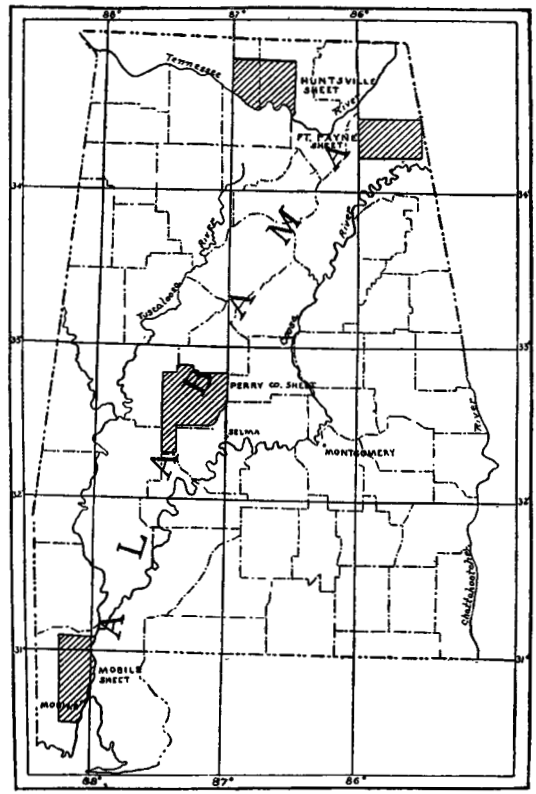

FIG. 14.—Sketch map showing location of the Fort Payne area, Alabama.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVOLPMENT.

In 1540 a large expedition under the leadership of De Soto entered what is now the State of Alabama. Not many miles northeast of Fort Payne are some cavelike dwellings carved out of the rock and protected from assault by a stone wall, which, according to tradition, was built by De Soto. He is believed to have made this stronghold his headquarters for a time.

Besides hunting and fishing, the Indian tribes of this section of the country practiced some agriculture. Though their methods were primitive, farming was carried on quite extensively along the streams. The Creeks and Cherokees, by treaties with the Government, had by 1832 ceded most of their lands to the United States, and by the end of 1838 nearly all the Indian tribes had transferred their lands, and had moved to some of the western reservations.

The narrow, fertile valleys attracted the attention of the first white settlers, and upon these soils they located. Corn, wheat, oats, and cattle were the main early agricultural products, cotton being grown only in sufficient quantities to supply material for clothing. It was not until much later that the mountain districts began to be settled and became of some agricultural importance, and until then cotton was a secondary product. With the development of these upland soils cotton came to be more extensively grown, the lighter character of the soils being found better adapted to this crop than to either wheat or corn. Cotton is at present the principal product of this section of the State, its growth having materially increased during the past fifteen or twenty years. No trouble has so far been experienced with the boll weevil.

At one time a small tobacco farm and manufactory were established a few miles southwest of Fort Payne, but at present tobacco is grown only in small quantities for home consumption, almost every farm having its tobacco patch.

The first settled lands were purchased from the Government for $1.25 an acre. Later the homestead act was passed, and under this law much of the mountain land was acquired. When the Alabama and Chattanooga Railroad (now the Alabama and Great Southern) was constructed through this section, the railroad company received from the Government considerable land. Every odd-numbered section not already disposed of, both east and west of their line for a distance of 15 miles, was granted them. The company is at present disposing of this unimproved land for from $3 to $5 an acre.

Much of the upland at the present time is owned and controlled by this railroad company, though a great deal has been disposed of in the last few years. The general trend of emigration is to the northward on the mountain ranges, especially to Sand Mountain.

CLIMATE.

No Weather Bureau station exists in the area, the nearest being situated at Valleyhead, a few miles north of Fort Payne, and at Maplegrove, about 20 miles south. From the observations made at these stations the following tables of normal monthly and annual temperature and precipitation are obtained. It will be noticed that the maximum precipitation occurs during the spring and summer months.

Normal monthly and annual temperature and precipitation.

Month.	Valleyhead.		Maplegrove.		Month.	Valleyhead.		Maplegrove.	
	Temperature.	Precipitation.	Temperature.	Precipitation.		Temperature.	Precipitation.	Temperature.	Precipitation.
	° *F.*	*Inches.*	° *F.*	*Inches.*		° *F.*	*Inches.*	° *F.*	*Inches.*
January	39.3	5.39	42.8	5.36	August	75.7	4.75	78.8	3.90
February	42.7	5.68	42.0	4.99	September	70.7	3.50	73.6	2.81
March	49.7	6.68	52.9	5.77	October	58.2	2.86	61.2	2.55
April	59.5	5.01	60.3	5.52	November	48.7	2.29	51.3	3.14
May	66.7	3.75	69.6	3.16	December	41.9	4.51	43.2	4.33
June	74.5	5.22	76.7	4.13	Year	58.7	54.75	61.0	50.46
July	76.3	5.11	79.2	4.80					

PHYSIOGRAPHY AND GEOLOGY.

In its physiographic and geological relations the Fort Payne area forms a part of the western division of the Appalachian Province, as it is called. This division embraces the Cumberland Plateau and the Allegheny Mountains, and extends from New York to Alabama. The surface of this portion of the country consists of broad, level plateaus, alternating with narrow valleys. The character and position of both the plateaus and the intervening valleys are closely connected with the character and structure of the underlying rocks. The northwestern portion of the area covered by this survey is occupied by Sand Mountain. This is a plateau having in places an elevation of nearly 1,300 feet above sea level. Its eastern extension forms a bold escarpment facing Wills Valley. Extending in a northeast and southwest direction through the central portion of the area is Lookout Mountain, another plateau several miles in extent, and characterized by the same surface features as Sand Mountain, except that the surface has been modified to a much greater extent by Little River and its larger tributaries. Lookout Mountain attains a maximum elevation of over 1,600 feet. Like Sand Mountain, the plateau forming Lookout Mountain is characterized by bold escarpments from 600 to 1,000 feet in height, on the east and west sides.

These plateaus are quite similar in many respects, and contain many large areas of almost perfectly smooth and level land, so densely wooded that one may travel miles without any intimation that it is not a low and perfectly level country. Although both these mountains are plateaus, the surface is not perfectly level, but rather higher at the edges, sloping gradually toward the center, and thus forming a broad, gentle trough.

The form of the escarpments of these plateaus bears a close relation to the hard and soft rocks which constituted them. At the surface of the plateaus are hard sandstones which resist erosion, while under

these are softer rocks, such as shales or limestones. The hard sandstone capping is being constantly undermined, and breaks off, forming great cliffs.

In striking contrast to the broad, flat type of table mountains or plateaus, are the intervening valleys, which follow the same general northeast and southwest trend. The valleys are in nowise smooth and regular, but their continuity is broken by elongated, prominent ridges, so that frequently these valleys between the plateaus are divided into two or more parallel valleys. The valleys owe their position to the fact that they are composed of softer rocks which are not able to resist erosion as well as the harder sandstones capping the mountains. Among these softer rocks, however, are found interbedded strata of sandstones and slightly more resistant rocks, and these form the ridges which give contour to the valleys.

The rocks exposed in the Fort Payne area are all of sedimentary origin, and belong to the Paleozoic age. The oldest rocks in the area consist of the Connesauga shales, which are of a sandy nature and weather into sandy loams. The Knox dolomite is an exposed rock formation found in the area, and on weathering forms a broken country consisting of low, irregular, rounded hills, which are covered by shallow, cherty soils.

In addition to the Knox dolomite, thick beds of massive limestone also outcrop. These weather into heavy loams, which are classed with the Hagerstown series. The Rockwood formation, consisting of shales, sandstones, limestones, conglomerates, and red iron ores, weathers into characteristic soils, and in places where the sandier beds become more prominent, forms the Penn sandy loam.

In addition to these formations are other shales and limestones and sandstones which have given rise to various soil formations of the area and which will be referred to later.

SOILS.

The soils of the Fort Payne area have been classified into eight types. With but one exception these soils are residual in origin. The appended table gives the extent of each of the several soil types.

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
De Kalb sandy loam	182,656	56.1	Clarksville loam	4,992	1.5
Fort Payne stony loam	68,864	21.2	Hagerstown clay	3,968	1.2
De Kalb stony loam	37,120	11.4	Penn sandy loam	576	.2
Hagerstown loam	21,632	6.6	Total	325,504	.....
Chattooga loam	5,696	1.8			

DE KALB SANDY LOAM.

The soil of the De Kalb sandy loam is a gray to reddish-brown loamy sand, with a depth of from 9 to 16 inches. It is made up of medium to fine sands, usually more or less coherent, owing to the presence of the cementing material of the parent rock. This cementing material, along with sufficient clay, silt, and organic matter, makes the sand somewhat loamy, and only upon elevations where the soil has been leached is there found a comparatively loose sand. In the depressions, where this heavier material has accumulated, is found a phase somewhat heavier than the typical soil, and slightly more retentive of moisture, yet having practically the same agricultural value. The subsoil is a yellowish-brown, slightly sticky sandy loam.

The De Kalb sandy loam is the upland type of the area and covers about 285 square miles, or 56 per cent of the area surveyed. It occurs on Sand Mountain in the western part of the area and on the Lookout Mountain range in the central part.

Upon Sand Mountain the surface of this formation is quite uniform, the average elevation being about 1,250 feet above sea level. The streams are as a rule quite small and mostly intermittent, the exceptions being Sauty Creek, in the extreme northwestern corner of the area, and Town Creek.

Along these principal streams and the steeper slopes the finer material has been carried away, thus exposing a sticky and somewhat clayey subsoil, or, sometimes, the underlying rock.

The De Kalb sandy loam is residual in origin, being derived from the underlying sandstone formation. In the northwestern part of the area, i. e., on Sand Mountain, the sands on the whole are somewhat finer in texture, and in many places the sandy loam subsoil is lacking, the soil being practically the same to bed rock, which is encountered anywhere from 10 to 36 inches beneath the surface.

The Lookout Mountain range is more rough and rugged than Sand Mountain, and is drained by many small streams, which have cut deep gullies in seeking the main drainage stream—Little River. On the whole, outcrops of the basal sandstone are more numerous than on Sand Mountain, while in some areas immense conglomerate and sandstone bowlders appear upon the surface. The natural timber growth is pine, oak, and poplar.

The principal crops grown upon this sandy soil are cotton and corn, with a few fields of wheat, rye, and grass. Wheat planted in October and harvested in June produced a straw of good quality, but the grain yield was light, the average being 7 bushels per acre. After the wheat is harvested cowpeas are planted for feed, and thus two crops are secured from one field the same year, and at the same time the soil has been improved. The average yield of cowpeas is about 6 bushels per acre.

Cowpea hay and sorghum are the main forage crops, although some small fields of bluegrass have done fairly well. A variety of grass known as herd's-grass has been successfully grown, but owing to the loose texture of the soil it can not be pastured, especially when the soil is in a moist condition.

The De Kalb sandy loam is easily cultivated and responds very readily to the application of fertilizers. It is usual to apply a complete fertilizer, i. e., a fertilizer containing nitrogen, phosphoric acid, and potash, the latter being considered the least important. As much as 400 pounds per acre of such fertilizer has been used with profitable results. The amount of fertilizer used for cotton and wheat varies from 150 to 200 pounds, and the cost averages about $1.50 an acre. For corn, from 75 to 100 pounds per acre are used.

In a favorable season the De Kalb sandy loam produces from 600 to 800 pounds of seed cotton and from 15 to 25 bushels of corn per acre.

Apples are very readily grown, and the fruit is large and well flavored. The favorite varieties are Gates, Shockley, and Ben Davis. Peaches also do well, and a few grapes are grown. Vegetables of all kinds are successfully grown for home consumption, but trucking as an occupation is not carried on to any great extent, owing to poor transportation facilities and distance from markets.

Almost any crop adapted to a light, porous soil will do well on the De Kalb sandy loam.

The following table gives the mechanical analyses of typical samples of this soil:

Mechanical analyses of De Kalb sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct*
10027	Albertville	Brown sandy loam, 0 to 12 inches.	0.54	0.08	3.00	14.84	27.62	7.54	33.84	12.38
10023	6 miles E. of Fort Payne.	Gray sandy loam, 0 to 9 inches.	1.30	.18	1.24	5.34	46.84	11.86	20.40	13.44
10025	3¼ miles SE. of Fort Payne.	Sandy loam, 0 to 12 inches.	1.31	.50	11.04	26.08	24.18	4.26	17.78	16.10
10028	Subsoil of 10027...	Brown sandy loam, 12 to 36 inches.	.48	.28	2.46	13.94	23.54	6.78	36.08	16.52
10026	Subsoil of 10025...	Sandy loam, 12 to 30 inches.	.47	.22	8.22	28.74	21.52	4.00	18.34	18.90
10024	Subsoil of 10023...	Light yellow sand, 9 to 36 inches.	.42	.18	1.16	4.24	46.02	12.24	15.30	20.70

FORT PAYNE STONY LOAM.

The soil of the Fort Payne stony loam is a gray to light-brown silty loam, 10 to 14 inches deep, containing a high percentage of chert. The subsoil is a much heavier yellowish-red loam or clay, which also contains quantities of chert fragments. These also occur on the surface over the greater part of the area of this type.

This soil is situated in a very broken country, consisting of hills and ridges with intervening valleys. These ridges, which extend through the area, have a general northeast-southwest direction and vary in width. The soil on the ridge which lies between Lookout Mountain and Sand Mountain west of Fort Payne is typically developed, and very little of it is suitable for farming land.

Owing to its physiographic position and stony nature little of the Fort Payne stony loam is under cultivation. When cleared and cultivated the slopes wash badly and much of the surface soil is carried away. It is not a strong soil, and, while usually of a grayish color, in some places is so free from vegetable matter as to be almost white. On the more gentle slopes, however, where the fragments are smaller and less numerous, some agriculture is practiced. Also, where the fine cherty material has been washed down from the steep hillsides and slopes onto the heavier valley soils some good crops are produced.

Where the transportation of the finer gravelly material has been extensively carried on and the washed material laid down upon the limestone soils beneath, the chert fragments are stained red. This displaced phase of the Fort Payne stony loam produces fairly good crops and is generally under cultivation.

The Fort Payne stony loam is locally known as "gravelly land," and the area it occupies as "the ridges." The soil is derived from the underlying rock, the Knox dolomite formation. This is a limestone rock containing a large percentage of difficultly soluble quartz in the form of chert. The calcareous material that has gradually become dissolved is leached out of the soil and carried away, leaving behind the hard, flinty material. This chert often contains crinoidal stems and other fossiliferous remains. It is usually white in color, although often stained brown and red by the presence of iron. The fragments contained in the subsoil are nearly always more or less stained.

The hills and ridges, which in places are nothing more than immense heaps of chert, do not support vegetation enough to pay for the fencing for pasture. They do, however, produce a fine growth of Spanish and black-jack oak, pine, and some chestnut.

On the less stony ridges, where the soil is deeper and the slopes not so steep, a few fields are under cultivation. Cotton does well the first year, but unless fertilizers are liberally applied poor yields result in succeeding years. Upon this soil a rotation of crops, including the legumes, should be practiced.

The Fort Payne stony loam is adapted to the growing of fruits, and it is recommended for this purpose. Peaches do best, and when properly cultivated and not injured by frosts a good quality of fruit is produced. During the past few years numerous peach orchards have been planted and some flattering results obtained. Eastern capitalists have in some instances furnished the trees and paid one-half the expense of cultivating them, while the owner of the land received one-half the proceeds. In one instance, from a 75-acre orchard, the first crop is said to have yielded 11,500 crates of peaches. The smallest price received was $1.05 a crate net, while some brought $1.75 net. The market for the fruit is found in the East, where it is shipped in carload lots. The Elberta is the favorite variety.

Corn, cotton, and some wheat are grown, but the yields are usually light.

The Fort Payne stony loam can be bought for from $2 to $3 an acre.

The following table gives the mechanical analyses of the fine earth of this soil:

Mechanical analyses of Fort Payne stony loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10047	4 miles NE. of Gaylesville.	Gray loam, 0 to 12 inches.	0.97	5.20	6.34	3.90	10.04	9.06	40.62	24.70
10049	1 mile E. of Morgan Gap.	Heavy loam, 0 to 15 inches.	.64	3.80	5.84	4.04	7.86	5.66	42.30	30.44
10045	2 miles S. of Chesterfield.	Gray clay loam, 0 to 12 inches.	1.36	3.16	3.56	2.50	5.48	5.60	46.70	32.36
10050	Subsoil of 10049....	Red clay, 15 to 36 inches.	.59	3.40	5.16	3.78	7.48	5.58	47.00	27.40
10048	Subsoil of 10047....	Brown clay loam, 12 to 36 inches.	.41	3.70	4.88	3.38	8.42	8.02	36.86	34.68
10046	Subsoil of 10045....	Heavy clay loam, 12 to 36 inches.	.37	2.48	3.10	1.88	5.86	6.14	44.70	35.82

DE KALB STONY LOAM.

The De Kalb stony loam is a heavy sandy loam varying in depth from 8 to 12 inches, resting on a subsoil of stiff red to yellow clay. Both soil and subsoil contain a large quantity of rock fragments, mostly sandstone, conglomerate, and sandy calcareous shale, with some limestone. Fragments of these rocks are also strewn on the surface.

The type is found along the escarpments of the uplands, and also in long, narrow strips, following outcrops of the Rockwood formation. The topography is very rough, and in many places the outcrops result in steep hillsides and perpendicular cliffs; in other places the rock is

only thinly covered by soil, which has considerable tendency to wash. Though its clay subsoil makes it quite retentive of moisture, sufficient drainage is always secured.

This type of soil is formed directly from the weathering of the rocks of the Lookout sandstone and Rockwood formation.

The forest growth consists of white oak and chestnut, with some hickory, black gum, and red oak. But little of it has been cut. Owing to its position on steep hillsides only a small area of the type is adapted to agriculture, though on some of the gentler slopes it is cultivated to some extent. The soil is naturally productive, and good yields of cotton and corn are obtained.

In the northeastern part of the area, around Jamestown and Chesterfield, peaches are grown to a considerable extent on this type. Although but about two crops are secured in five years, the yield is satisfactory, the quality excellent, and the industry is a profitable one.

The following table gives the mechanical analyses of the fine earth of this soil:

Mechanical analyses of De Kalb stony loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
10017	Davis Gap.....	Sandy loam, 0 to 12 inches.	1.44	0.98	2.02	4.22	25.90	14.84	31.50	20.12
10019	¾ mile SE. of Fort Payne.	Yellow sandy loam, 0 to 12 inches.	.88	.40	.90	1.16	17.06	16.06	35.64	27.94
10021	1½ miles W. of Gaylesville.	Brown sandy loam, 0 to 12 inches.	.94	1.20	1.46	.94	5.12	31.68	30.50	28.78
10018	Subsoil of 10017...	Loam to clay, 12 to 36 inches.	.14	1.06	1.64	2.26	21.06	16.30	29.90	27.10
10020	Subsoil of 10019...	Loam to clay, 12 to 36 inches.	.27	.22	.76	1.10	12.76	19.88	27.80	37.36
10022	Subsoil of 10021...	Brown loam, 12 to 36 inches.	.72	.54	.82	.50	2.48	11.56	22.40	61.80

HAGERSTOWN LOAM.

The Hagerstown loam consists of yellowish-brown loam from 8 to 12 inches deep, underlain by a yellow or reddish-yellow loam, which at about 18 inches usually grades into a stiff clay.

This soil is essentially a valley soil, and occurs in the narrow valleys of the area, both east and west of the Lookout Mountain range. In Big Wills Valley it extends the entire width of the area. This unbroken area averages 1 mile in width, but at Lebanon becomes narrower, being encroached upon from the west by the Fort Payne stony loam.

Extensive unbroken areas also occur in the southeastern part of the area. These valleys, although quite narrow throughout the area, tend to become wider toward the southern boundary. A few miles farther south they broaden considerably, forming a very productive and important farming country. Some mounds and knolls of Hagerstown clay, too small to be represented separately on the map, have been included with the Hagerstown loam. Scattered about on these areas are fragments of chert and sandstone.

The floors of the valleys are slightly rolling, and are usually intersected by a stream; consequently the soils are well drained. On account of its physiographic position the soil of the Hagerstown loam may vary slightly in texture. The finer material from the adjacent slopes finds its way to the valley, there often forming a thin coating over the true residual soil. This is more often the case near the streams, and a somewhat lighter soil, having a larger content of silt and fine sand, is the result. Local differences are but slight, the soil always being underlain by the heavy limestone subsoil.

The soil owes its origin to the decay of the underlying limestone, which is massive, highly fossiliferous, and blue in color.

For many years these valley soils were the only ones that were used for general farming purposes, and the high agricultural value of the Hagerstown loam was early recognized in this section, and upon it the first farms were located. On account of the naturally good yields secured from this type the use of fertilizers and the rotation of crops have been practically ignored, and a field has been called upon to produce the same crop year after year. Such methods of farming soon deteriorate the productiveness of the soil, and fields so treated can not be expected indefinitely to produce good results. A rotation of cotton, corn, wheat or rye, and cowpeas should be practiced. Oats sown broadcast at the time cotton is "laid by" have proved quite successful. In favorable seasons much fall plowing is done on this soil.

Some oak, pine, and hickory remain, but most of the timber growth has been removed.

Corn, cotton, wheat, and oats do well upon this soil, the yields in favorable seasons being above the average of the other soils of the area. Grass does well; clover yields from 1½ to 2 tons per acre. Outcrops of the underlying rock render some small areas unfit for cultivation, and it is these that are used for pastures. This stony condition is particularly true of the northern extremity of Big Wills Valley.

The Hagerstown loam is best adapted to general farming purposes, and is the only profitable grass soil of the area. It ranges in price from $15 to $25 an acre.

The table following gives the mechanical analyses of typical samples of this soil.

Mechanical analyses of Hagerstown loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10041	2½ miles W. of Collinsville.	Loam to clay loam, 0 to 15 inches.	0.50	2.00	4.46	2.96	7.26	7.24	45.90	29.96
10039	3 miles NE. of Gaylesville.	Brown loam, 0 to 10 inches.	.76	1.96	3.50	2.34	7.98	11.92	40.20	31.90
10043	2½ miles W. of Fort Payne.	Heavy loam, 0 to 12 inches.	.39	.96	5.24	4.20	11.60	4.80	36.10	37.02
10044	Subsoil of 10043....	Yellow clay loam, 12 to 36 inches.	.03	1.52	4.84	3.96	10.10	6.98	32.90	39.40
10040	Subsoil of 10039....	Brown clay loam, 10 to 36 inches.	.41	.96	3.44	2.02	6.66	7.74	33.86	45.30
10042	Subsoil of 10041....	Yellow stiff clay, 15 to 36 inches.	.43	1.32	2.58	1.80	4.22	5.48	36.30	48.14

HAGERSTOWN CLAY.

The Hagerstown clay is the heaviest soil of the area, and consists of a heavy red loam extending to a depth of from 6 to 9 inches, and underlain by a subsoil of heavy red clay somewhat darker in color than the soil. The subsoil when dry is friable, and in texture resembles a heavy clay loam. It usually contains a small amount of sand, but when wet becomes quite tenacious.

This type does not occur in extensive areas, but occupies knolls and ridges in the limestone valleys, principally in the vicinity of Gaylesville. These elevations rise from 25 to 200 feet above the floor of the valley proper, the soil being next in position above the Hagerstown loam.

Upon the surface are scattered fragments of chert, quartz pebbles, iron concretions, and some pieces of sandstone. On exposed slopes, where the washing action of the rains has taken place, deep gullies have been formed and much of the surface soil removed. These gullies often expose beds of deeply embedded chert, stained red by the presence of iron.

These small isolated knolls and elevations which represent this type were undoubtedly formed from beds of chert, which, because of their more resistant nature, have withstood weathering and eroding agencies longer than the including limestone.

Like the Hagerstown loam, this soil is residual in origin, being derived from the decay of the underlying limestone. It is, however, a much heavier soil and of a more decided red color.

The greatest objection to this soil for agricultural purposes is its

inclination to wash badly, little attention having been paid to remedying this evil. On the steep slopes care should be taken to prevent this gullying and consequent ruin of the land for agricultural purposes. This can be accomplished by terraces or sidehill ditches. Some areas of this soil bear a permanent sod, which affords good pasture and prevents the washing to a marked degree.

On areas where washing has not been so pronounced and the surface soil remains, some fair crops have been grown, but for general farming the Hagerstown clay is considered too difficult to cultivate.

Some cotton, corn, and wheat are grown, the latter producing an average of from 15 to 20 bushels per acre. Cotton becomes stained by coming in contact with the soil, and consequently brings a smaller price on the market.

The following table gives the mechanical analyses of the fine earth of this soil:

Mechanical analyses of Hagerstown clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10033	1¼ miles E. of Chesterfield.	Red heavy loam, 0 to 10 inches.	1.27	0.50	1.58	3.00	16.26	11.50	38.50	28.66
10037	4 miles NE. of Gaylesville.	Brown loam to clay, 0 to 9 inches.	1.33	.32	2.52	3.66	15.94	9.52	30.68	37.00
10035	1 mile SW. of Gaylesville.	Red heavy loam, 0 to 9 inches.	.65	.60	1.70	1.70	9.62	10.00	38.30	37.72
10038	Subsoil of 10037....	Red heavy clay, 9 to 36 inches.	.39	.50	2.00	2.56	12.46	7.92	23.46	51.10
10034	Subsoil of 10033....	Red stiff clay, 10 to 36 inches.	.54	.34	1.32	2.36	11.08	5.36	27.72	51.82
10036	Subsoil of 10035....	Red heavy clay, 9 to 36 inches.	.51	.70	1.08	1.20	6.34	6.38	26.:6	57.76

CHATTOOGA LOAM.

The soil of the Chattooga loam is a yellowish-brown to gray sandy loam, grading into a loam at about 10 inches. It is usually slightly sticky, owing to the presence of silt and organic matter. A heavier phase of the type occurs in low-lying areas. The sands vary in texture from fine to medium. The subsoil is a yellowish-brown loam containing a high percentage of both fine sand and silt. It contains sufficient clay, however, to make it a heavy, coherent loam.

The Chattooga loam is found principally in the southeastern part of the area, where it forms a narrow strip of land on each side of the Chattooga River. It also occurs as bottom land along the lower course

of Little River, and in a few other narrow strips along some of the smaller streams.

The soil occupies river terraces or second bottoms, and has a slightly rolling surface. Some of the areas are subject to occasional overflow, but those which lie more remote from the streams are never flooded.

The Chattooga loam is derived in part through the weathering of the Connesauga shales, and in part through deposition of materials brought down by the streams. The areas near the streams are more sandy than those lying farther back, and in some cases the soil itself is formed almost entirely of alluvial material.

The low, flat areas of the Chattooga loam are so poorly drained as to be unfit for agriculture. The greater part of the type, however, is under cultivation. Because of the danger from overflow on some areas, and owing to the fact that on the heavier areas cotton suffers injury from rust, the soil is used more for the production of corn than for cotton.

Pine, black-jack oak, and red oak comprise the forest growth on this soil. On the more sandy areas some shortleaf pine is found.

The following table gives mechanical analyses of typical samples of this soil:

Mechanical analyses of Chattooga loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10013	1½ miles NE. of Gaylesville.	Brown sandy loam, 0 to 10 inches.	0.61	0.28	2.58	6.06	29.06	16.68	31.80	13.30
10015	3 miles N. of Gaylesville.	Brown sandy loam, 0 to 10 inches.	.57	.18	.90	1.40	24.50	19.48	38.00	15.20
10014	Subsoil of 10013...	Brown heavy loam, 10 to 36 inches.	.16	.30	1.96	4.44	22.86	11.40	33.98	24.76
10016	Subsoil of 10015...	Brown loam, 10 to 36 inches.	.51	.00	.54	.92	12.96	11.94	43.10	30.54

PENN SANDY LOAM.

The soil of the Penn sandy loam is a dark-red sandy loam, varying in depth from 8 to 14 inches. The particles of sands are coarse and well rounded. The subsoil is a stiff, heavy, Indian-red clay, containing some coarse sand and iron concretions. In some instances the subsoil is lacking, and the soil rests upon the bed rock, and where such is the case the depth of the soil varies anywhere from 8 to 20 inches.

Less than 1 square mile of this soil type is found within the area

surveyed. The several areas are small in extent, the largest occurring a few miles northwest of Fort Payne. There are also some small patches in the southwestern part of the area, which occur as slight elevations or ridges and occupy a much lower position than the larger ones.

This type occupies the tops of mountains, occurring as a succession of knobs. Owing to the thin stratum of rock from which this formation is derived, the Penn sandy loam occurs as a mere covering for the underlying shales. On account of its physiographic position, this soil has been subjected to much erosion, and there remains to-day but a small area of irregularly-distributed soil, which at one time must have capped the entire ridge.

Being residual in origin, numerous fragments of the underlying sandstone occur upon the surface, yet nowhere is this soil too stony to permit of cultivation. It is well drained, easily tilled, and, on account of its heavy subsoil, retentive of moisture.

Cotton and corn, as upon all other soils of the area, are the crops grown upon the Penn sandy loam. Melons and vegetables are produced for home consumption. The yield of corn varies from 15 to 25 bushels an acre.

The following table gives mechanical analyses of typical samples of the fine earth of this soil:

Mechanical analyses of Penn sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10053	½ mile NW. of Fort Payne.	Red sandy loam, 0 to 10 inches.	0.73	4.36	23.28	11.24	29.36	5.34	8.38	18.04
10055	½ mile SE. of Morgan Gap.	Red sandy loam, 0 to 10 inches.	1.03	.88	17.78	9.04	21.04	12.26	20.10	18.60
10056	Subsoil of 10055...	Red sandy clay, 10 to 26 inches.	.69	2.00	22.32	8.08	13.60	8.80	19.98	25.32
10054	Subsoil of 10053...	Sandy loam, 10 to 36 inches.	.32	6.22	19.20	8.54	19.62	3.72	4.70	37.80

CLARKSVILLE LOAM.

The soil of the Clarksville loam consists of a rich dark-brown loam to a depth of about 12 inches. It contains a considerable percentage of silt, and is underlain by a brown to yellowish-brown loam of somewhat heavier character.

The areas of this type are small in extent, the largest bodies occurring in the northern and northeastern parts of the area. They occupy

small areas along both the large and small streams, and because of their position are subject to occasional overflow. The streams rise and fall rapidly, however, and the adjacent lands do not long remain inundated.

This soil is alluvial in origin and is composed of the finer material, consisting of fine sand, silt, and organic matter, which has been washed down from the upland soils on the steep hillsides and slopes. Small spots varying in size from 2 to 25 acres occur in areas of Hagerstown loam. These are found in depressions and low places along the streams, especially in Big Wills Valley.

The wash from the Hagerstown clay forms the typical Clarksville loam. Hence this soil is best developed in the eastern part of the area.

The Clarksville loam is easily cultivated and, while as a rule crops can not be planted as early upon it as upon some of the lighter soils of the area, they mature quite as soon. The entire area of this soil is usually under cultivation.

Corn does especially well, and does not suffer noticeably during continued droughts. On account of some danger from overflow, this soil is more often planted to corn than to other crops. Cotton, wheat, and oats are also grown, and in favorable seasons produce higher yields than on the other soils of the area.

From 30 to 40 bushels of corn is the average yield per acre. The Clarksville loam is considered the most productive soil of the area.

The following table gives mechanical analyses of typical samples of this soil:

Mechanical analyses of Clarksville loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10057	3⅕ miles W. of Collinsville.	Brown loam, 0 to 15 inches.	0.80	0.00	0.38	0.36	1.02	4.44	67.80	25.70
10011	1¾ miles E. of Chesterfield.	Brown loam, 0 to 12 inches.	1.16	.80	1.96	3.16	18.12	11.46	37.80	26.48
10058	Subsoil of 10057....	Brown loam, 15 to 36 inches.	.48	.10	.38	.38	1.80	8.90	60.10	28.02
10012	Subsoil of 10011....	Loam, 12 to 36 inches.	.78	.32	1.40	2.50	14.94	10.02	36.88	33.80

AGRICULTURAL CONDITIONS.

Notwithstanding that there is quite a wide range in both the texture and physiographic position of the soils of the Fort Payne area, agriculture has not reached a very high state of development, chiefly on

account of the lack of ready and cheap transportation. Of the 500 square miles embraced in the area, not more than one-fourth is under cultivation.

A large proportion of the area is covered with pine and hardwood forests. Lookout Mountain, in the central part of the area, and Sand Mountain, in the western part, are densely covered with forests of pine, oak, and poplar, and the merchantable timber is becoming yearly more valuable, with the exhaustion of the forest products of the Northern States. Sawmills are located throughout the area, the product of which is hauled to the nearest shipping points. In the eastern and southeastern parts of the area much timber has been utilized in making charcoal, which is used in smelting iron ores.

The average-sized farm contains about 160 acres, and varies in value according to its location and the character of the soils. The De Kalb sandy loam, which covers the largest area and occurs on both mountain ranges, can be bought, unimproved, for from $3 to $5 an acre. This upland country is being rapidly settled, and upon it some well-improved and profitable farms are located. Owing to its low price and the ease with which this soil is cultivated, the De Kalb sandy loam is one of the most desirable soils of the area. The cost of clearing is but slight, as the wood can usually be disposed of at near-by mills or gins, bringing from $1 to $1.50 a cord, thus reducing the cost of clearing to a merely nominal figure.

Most of the farms are cultivated by the owners, though some are farmed by tenants. A few of these tenants are negroes, but the colored population of the area is small and confined mostly to the towns, and white labor is usually employed on the farms. Women and children assist in the work of gathering crops and hoeing and picking cotton. During the cotton-picking season the schools are often dismissed.

The farm dwellings are usually one-story structures, often constructed of logs and heated by a fireplace. The barns and sheds are also poorly built, and afford insufficient protection to stock and harvested crops. In the more prosperous sections, however, large, well-built and painted houses and barns are not uncommon. Except in sections of the area where stock laws are in force, fences are not kept in good repair.

Though this section is considered by many of the inhabitants to be too far north for the successful growing of cotton, it is the main money crop of the area, and is grown to the exclusion of the subsistence crops. The springs are often backward, delaying planting, which is usually done from the middle to the last of April, and the early fall frosts frequently kill the plant before all the bolls have matured. By the middle of November the greater part of the crop has been picked and sold, and new leases of land made for the following year.

The condition of the soils of the entire area shows that greater care should be taken to maintain their productiveness. Instead of applying commercial fertilizers for almost every crop, as is now the general practice, green manuring should be practiced more extensively. The plowing under of clover and cowpeas is a very desirable method of enriching the soil, and good results can thus be obtained at much less expense than where commercial fertilizers alone are depended on.

The rotation of crops would also be found beneficial. This is at present very little practiced, and year after year the same area is expected to produce abundant yields of the same crop. With the clean cultivation given cotton and corn the soil becomes deficient in organic matter and is said to be "worn out." A rotation of crops including cotton, corn, wheat, and cowpeas would be suited to the heavier soils of the area, and would result in increased yields.

Under ordinary methods of cultivation the De Kalb sandy loam becomes exhausted after the third year, though by systematic farming and careful management some of the more intelligent farmers have brought this type to a higher state of productiveness than it originally possessed.

The Fort Payne stony loam and the De Kalb stony loam are recommended for the growing of fruit. Numerous peach and apple orchards have recently been planted upon these soils, and satisfactory results obtained. Many of the orchards, however, receive but little attention after being set out, and consequently the trees are short lived. Strawberries and small fruits do well on the Fort Payne stony loam, and during the past season one man received $800 as the net profit from 10 acres planted to this crop. The De Kalb sandy loam is a soil well adapted to the trucking industry, and awaits only better transportation facilities to be developed along this line.

Two railroads intersect the area. The main line of the Alabama and Great Southern Railroad runs along the western base of the Lookout Mountain range, and the Chattanooga Southern along the eastern foot of the same mountain. Freight rates are high. While these two roads afford transportation facilities for the eastern part of the area, none exist in the western portion.

The wagon roads throughout the area are above the average for a mountainous country, and are seldom muddy, except upon the limestone soils. Roads crossing the sandy soils are apt to be deep in dry weather, but become compacted and firm following heavy rains. The roads leading through the cuts and mountain gaps are wide and well graded, fragments of chert being used to good advantage for surfacing material in some localities.

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U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP

ALABAMA
FORT PAYNE SHEET

SOIL PROFILE
(3 feet deep)

Fort Payne stony loam
Sdc St
Sdc St

De Kalb stony loam
Sdc St
C St

De Kalb sandy loam
S
S

Penn sandy loam
Ssc
C

Chattooga loam
Ssc
Sc

Hagerstown loam
Sc
C

Clarksville loam
Sc
C

Hagerstown clay
Sc
Scc

LEGEND

Sdc St — Stony loam
C St — Clay and stone
Ssc St — Sandy loam and stone
S — Sand
Ssc — Sandy loam
C — Clay
Sc — Loam
Scc — Clay loam

LEGEND

Fl — Fort Payne stony loam
Dl — De Kalb stony loam
Ds — De Kalb sandy loam
Pl — Penn sandy loam
C — Chattooga loam
Hl — Hagerstown loam
Cl — Clarksville loam
Hc — Hagerstown clay

Soils surveyed by
Grove B. Jones and M. E. Carr
1903.

BASE MAP ENLARGED AND REDRAWN FROM
U.S. GEOLOGICAL SURVEY SHEET 1900

Scale 1 inch = 1 mile

A. Hoen & Co. Lith. Baltimore, Md.

Field Operations
Bureau of Soils
1903.